

## **AMENDMENTS TO THE CLAIMS**

### **Listing of Claims:**

1. (Withdrawn) A process for the production of fine chemical, which comprises
  - a) increasing or generating the biological activity represented by a protein as depicted in SEQ ID NO: 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 56, 58, 60, 62, 64, 66, 68, 70, 72, 74, 76, 78, 80, 82, 84, 86, 88, 90, 92, 94, 96, 98, 100, 102, 104, 106, 108, 110, 112, 114, 116, 118, 120, 122, 124, 126, 128, 130, 132, 134, 136, 138, 140, 142, 144, 146, 148, 150, 152, 154, 156, 158, 160, 162, 164, 166, 168, 170, 172, 174, 176, 178, 180, 182, 184, 186, 188, 190, 192, 194, 196, 198, 200, 202, 204, 206, 208, 210, 212, 214, 216, 218, 220, 222, 224, 226, 228, 230, 232, 234, 236, 238, 240, 242, 244, 246, 248, 250, 252, 254, 256, 258, 260, 262, 264, 266, 268, 270, 272, 274, 276, 278, 280, 282, 284, 286, 288, 290, 292, 294, 296, 298, 300, 302, 304, 306, 308, 310, 312, 314, 316, 318, 320, 322, 324, 326, 328, 330, 332, 334, 336, 338, 340, 342, 344, 346, 348, 350, 352, 354, 356, 358, 360, 362, 364, 366, 368, 370, 372, 374, 376, 378, 380, 382, 384, 386, 388, 390, 392 or 394 in a non-human organism, or in one or more parts thereof; and
  - b) growing the organism under conditions which permit the production of the fine chemical in said organism.
2. (Currently amended) A process for the production of fine chemical comprising increasing or generating in an organism or a part thereof the expression of at least one nucleic acid molecule selected from the group consisting of:
  - a) a nucleic acid molecule encoding of the polypeptide as depicted in SEQ ID NO: 2, or a fragment thereof, which confers an increase in the amount of fine chemical in an organism or a part thereof;
  - b) a nucleic acid molecule comprising the nucleotide sequence as depicted in SEQ ID NO: 1; and

- c) a nucleic acid molecule which encodes a polypeptide having at least ~~70%~~ 95% sequence identity with the amino acid sequence of the polypeptide encoded by the nucleic acid molecule of (a) to (b) and conferring an increase in the amount of fine chemical in an organism or a part thereof; and
  - ~~d) a nucleic acid molecule which hybridizes with the nucleic acid molecule of (a) to (b) under stringent hybridization conditions and conferring an increase in the amount of fine chemical in an organism or a part thereof;~~
- or a nucleotide sequence complementary thereto, by introducing the nucleic acid molecule into the organism or part thereof and growing the organism or part thereof under conditions which permit the production of the at least one fine chemical in said organism or a part thereof, wherein the at least one fine chemical ~~comprises at least one compound~~ is selected from the group consisting of amino acids, carbohydrates, vitamins, organic acids, fatty acids, and ~~carotenoids~~ carotenoids.

- 3. (Previously presented) The process of claim 2 further comprising recovering the free or bound fine chemical.
- 4. (Previously presented) The process of claim 2 further comprising the following steps:
  - a) selecting an organism or a part thereof expressing the polypeptide encoded by the nucleic acid molecule characterized in claim 2;
  - b) mutagenizing the selected organism or the part thereof;
  - c) comparing the activity or the expression level of said polypeptide in the mutated organism or the part thereof with the activity or the expression of said polypeptide of the selected organism or the part thereof;
  - d) selecting the mutated organism or the part thereof, which comprises an increased activity or expression level of said polypeptide compared to the selected organism or the part thereof;
  - e) optionally, growing and cultivating the organism or the part thereof; and
  - f) recovering, and optionally isolating, the free or bound fine chemical produced by the selected mutated organism or the part thereof.

5. (Previously presented) The process of claim 2, wherein the activity of said polypeptide or the expression of said nucleic acid molecule is increased or generated transiently or stably.

6. (Withdrawn) An isolated nucleic acid molecule comprising a nucleic acid molecule selected from the group consisting of:

- a) nucleic acid molecule encoding of the polypeptide as depicted in SEQ ID NO: 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 56, 58, 60, 62, 64, 66, 68, 70, 72, 74, 76, 78, 80, 82, 84, 86, 88, 90, 92, 94, 96, 98, 100, 102, 104, 106, 108, 110, 112, 114, 116, 118, 120, 122, 124, 126, 128, 130, 132, 134, 136, 138, 140, 142, 144, 146, 148, 150, 152, 154, 156, 158, 160, 162, 164, 166, 168, 170, 172, 174, 176, 178, 180, 182, 184, 186, 188, 190, 192, 194, 196, 198, 200, 202, 204, 206, 208, 210, 212, 214, 216, 218, 220, 222, 224, 226, 228, 230, 232, 234, 236, 238, 240, 242, 244, 246, 248, 250, 252, 254, 256, 258, 260, 262, 264, 266, 268, 270, 272, 274, 276, 278, 280, 282, 284, 286, 288, 290, 292, 294, 296, 298, 300, 302, 304, 306, 308, 310, 312, 314, 316, 318, 320, 322, 324, 326, 328, 330, 332, 334, 336, 338, 340, 342, 344, 346, 348, 350, 352, 354, 356, 358, 360, 362, 364, 366, 368, 370, 372, 374, 376, 378, 380, 382, 384, 386, 388, 390, 392 or 394 or a fragment thereof, which confers an increase in the amount of fine chemical in an organism or a part thereof;
- b) nucleic acid molecule comprising of the nucleic acid molecule as depicted in SEQ ID NO: 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31, 33, 35, 37, 39, 41, 43, 45, 55, 57, 59, 61, 63, 65, 67, 69, 71, 73, 75, 77, 79, 81, 83, 85, 87, 89, 91, 93, 95, 97, 99, 101, 103, 105, 107, 109, 111, 113, 115, 117, 119, 121, 123, 125, 127, 129, 131, 133, 135, 137, 139, 141, 143, 145, 147, 149, 151, 153, 155, 157, 159, 161, 163, 165, 167, 169, 171, 173, 175, 177, 179, 181, 183, 185, 187, 189, 191, 193, 195, 197, 199, 201, 203, 205, 207, 209, 211, 213, 215, 217, 219, 221, 223, 225, 227, 229, 231, 233, 235, 237, 239, 241, 243, 245, 247, 249, 251, 253, 255, 257, 259, 261, 263, 265, 267, 269, 271, 273, 275, 277, 279, 281, 283, 285, 287, 289, 291, 293, 295, 297, 299, 301, 303, 305, 307, 309, 311, 313, 315, 317, 319, 321, 323, 325, 327, 329, 331, 333, 335, 337, 339, 341, 343, 345, 347, 349, 351, 353, 355, 357, 359, 361, 363, 365, 367, 369, 371, 373, 375, 377, 379, 381, 383,

- 385, 387, 389, 391 or 393 or a fragment thereof, which confers an increase in the amount of fine chemical in an organism or a part thereof;
- c) nucleic acid molecule whose sequence can be deduced from a polypeptide sequence encoded by a nucleic acid molecule of (a) or (b) as a result of the degeneracy of the genetic code and conferring an increase in the amount of fine chemical in an organism or a part thereof;
  - d) nucleic acid molecule which encodes a polypeptide which has at least 50% identity with the amino acid sequence of the polypeptide encoded by the nucleic acid molecule of (a) to (c) and conferring an increase in the amount of fine chemical in an organism or a part thereof;
  - e) nucleic acid molecule which hybridizes with a nucleic acid molecule of (a) to (c) under stringent hybridization conditions and conferring an increase in the amount of fine chemical in an organism or a part thereof;
  - f) nucleic acid molecule which encompasses a nucleic acid molecule which is obtained by amplifying nucleic acid molecules from a cDNA library or a genomic library using the primers in SEQ ID NO: 53 or SEQ ID NO: 54 and conferring an increase in the amount of the fine chemical in an organism or a part thereof;
  - g) nucleic acid molecule encoding a polypeptide which is isolated with the aid of monoclonal and/or polyclonal antibodies against a polypeptide encoded by one of the nucleic acid molecules of (a) to (f) and conferring an increase in the amount of fine chemical in an organism or a part thereof;
  - h) nucleic acid molecule encoding a polypeptide comprising the consensus sequence as depicted in SEQ ID NO: 47, SEQ ID NO: 48, SEQ ID NO: 49, SEQ ID NO: 50, SEQ ID NO: 51, SEQ ID NO: 52, SEQ ID NO: 397, SEQ ID NO: 398, SEQ ID NO: 399 and/or SEQ ID NO: 400 and conferring an increase in the amount of the fine chemical in an organism or a part thereof; and
  - i) nucleic acid molecule which is obtainable by screening a suitable nucleic acid library under stringent hybridization conditions with a probe comprising one of

the sequences of the nucleic acid molecule of (a) to (k) or with a fragment thereof having at least 15 nt, preferably 20 nt, 30 nt, 50 nt, 100 nt, 200 nt or 500 nt of the nucleic acid molecule characterized in (a) to (k) and conferring an increase in the amount of the fine chemical in an organism or a part thereof,

whereby the nucleic acid molecule distinguishes over the sequence as depicted in SEQ ID NO: 1, 55, 57, 59, 61, 63, 65, 67, 69, 71, 73, 75, 77, 79, 81, 83, 85, 87, 89, 91, 93, 95, 97, 99, 101, 103, 105, 107, 109, 111, 113, 115, 117, 119, 121, 123, 125, 127, 129, 131, 133, 135, 137, 139, 141, 143, 145, 147, 149, 151, 153, 155, 157, 159, 161, 163, 165, 167, 169, 171, 173, 175, 177, 179, 181, 183, 185, 187, 189, 191, 193, 195, 197, 199, 201, 203, 205, 207, 209, 211, 213, 215, 217, 219, 221, 223, 225, 227, 229, 231, 233, 235, 237, 239, 241, 243, 245, 247, 249, 251, 253, 255, 257, 259, 261, 263, 265, 267, 269, 271, 273, 275, 277, 279, 281, 283, 285, 287, 289, 291, 293, 295, 297, 299, 301, 303, 305, 307, 309, 311, 313, 315, 317, 319, 321, 323, 325, 327, 329, 331, 333, 335, 337, 339, 341, 343, 345, 347, 349, 351, 353, 355, 357, 359, 361, 363, 365, 367, 369, 371, 373, 375, 377, 379, 381, 383, 385, 387, 389, 391 or 393 by one or more nucleotides.

7. (Withdrawn) A nucleic acid construct comprising one or more regulatory elements which confers the expression of the nucleic acid molecule of claim 6.
8. (Withdrawn) A vector comprising the nucleic acid molecule as claimed in claim 6.
9. (Withdrawn) The vector as claimed in claim 8, wherein the nucleic acid molecule is in operable linkage with regulatory sequences for the expression in a prokaryotic or eukaryotic host.
10. (Withdrawn) A host cell transformed stably or transiently with the nucleic acid molecule as claimed in claim 6.
11. (Withdrawn) The host cell of claim 10, wherein the host cell is a transgenic host cell.
12. (Withdrawn) The host cell of claim 10, wherein the host cell is a plant cell, an animal cell, a microorganism, a yeast cell, a fungus cell, a prokaryotic cell, an eukaryotic cell or an archaeobacterium.

13. (Withdrawn) A process for producing a polypeptide, wherein the process comprises stably or transiently transforming the nucleic acid molecule as claimed in claim 6 into a host cell, and expressing the polypeptide encoded by said nucleic acid molecule in the host cell.

14-15. (Cancelled)

16. (Withdrawn) A plant, or plant tissue, propagation material, or harvested material thereof comprising the host cell as claimed in claim 12, wherein the host cell is a plant cell or an *Agrobacterium*.

17. (Withdrawn) A method for screening for agonists and antagonists of the activity of a polypeptide encoded by the nucleic acid molecule of claim 6 conferring an increase in the amount of fine chemical in an organism or a part thereof comprising:

- (a) contacting cells, tissues, plants or microorganisms which express a polypeptide encoded by the nucleic acid molecule of claim 6 conferring an increase in the amount of the fine chemical in an organism or a part thereof with a candidate compound or a sample comprising a plurality of compounds under conditions which permit the expression of the polypeptide;
- (b) assaying the fine chemical level or the polypeptide expression level in the cells, tissues, plants or microorganisms or a media wherein the cells, tissues, plants or microorganisms are cultured or maintained; and
- (c) identifying the agonist or antagonist by comparing the measured fine chemical level or polypeptide expression level with a standard fine chemical or polypeptide expression level measured in the absence of said candidate compound or said sample comprising said plurality of compounds, wherein an increased level over the standard indicates that the compound or the sample comprising said plurality of compounds is an agonist and a decreased level over the standard indicates that the compound or the sample comprising said plurality of compounds is an antagonist.

18. (Withdrawn) A process for the identification of a compound conferring increased fine chemical production in a plant or microorganism, comprising the steps:

- a) culturing a plant cell or tissue or microorganism or maintaining a plant expressing the polypeptide encoded by the nucleic acid molecule of claim 6 conferring an increase in the amount of the fine chemical in an organism or a part thereof, and utilizing a readout system which is capable of interacting with the polypeptide under suitable conditions which permit the interaction of the polypeptide with said readout system in the presence of a compound or a sample comprising a plurality of compounds, and said readout system is capable of providing a detectable signal in response to the binding of a compound to said polypeptide under conditions which permit the expression of said readout system and the expression of the polypeptide encoded by the nucleic acid molecule of claim 6 conferring an increase in the amount of the fine chemical in an organism or a part thereof;
- b) identifying if the compound is an effective agonist by detecting the presence or absence or increase of a signal produced by said readout system.

19. (Withdrawn) A method for the identification of a gene product conferring an increase in the fine chemical production in a cell, comprising the following steps:

- a) contacting the nucleic acid molecules of a sample, which can contain a candidate gene encoding a gene product conferring an increase in fine chemical after expression with the nucleic acid molecule of claim 6;
- b) identifying the nucleic acid molecules, which hybridize under relaxed stringent conditions with the nucleic acid molecule of claim 6;
- c) introducing the candidate nucleic acid molecules in host cells appropriate for producing the fine chemical;
- d) expressing the identified nucleic acid molecules in the host cells;
- e) assaying the fine chemical level in the host cells; and
- f) identifying nucleic acid molecule and its gene product which expression confers an increase in the fine chemical level in the host cell after expression compared to the wild type.

20. (Withdrawn) A method for the identification of a gene product conferring an increase in fine chemical production in a cell, comprising the following steps:

- a) identifying in a data bank nucleic acid molecules of an organism; which can contain a candidate gene encoding a gene product conferring an increase in the fine chemical amount or level in an organism or a part thereof after expression, and which are at least 30% homolog to the nucleic acid molecule of claim 6;
- b) introducing the candidate nucleic acid molecules in host cells appropriate for producing the fine chemical;
- c) expressing the identified nucleic acid molecules in the host cells;
- d) assaying the fine chemical level in the host cells; and
- e) identifying the nucleic acid molecule and its gene product which expression confers an increase in the fine chemical level in the host cell after expression compared to the wild type.

21. (Withdrawn) A method for the production of an agricultural composition comprising identifying a compound according to the method of claim 17, and formulating the identified compound in a form acceptable for an application in agriculture.

22-24. (Canceled)

25. (Withdrawn) Food or feed composition comprising the nucleic acid molecule of claim 6, a nucleic acid construct or a vector thereof, a polypeptide encoded thereby or an antibody which specifically binds to said polypeptide, a plant, plant tissue or harvested material thereof, or a host cell containing said nucleic acid molecule.

26. (Canceled)

27. (Withdrawn) A composition comprising the nucleic acid molecule of claim 6, a polypeptide encoded thereby, or an antibody which specifically binds to said polypeptide, or a nucleic acid construct or a vector thereof, and optionally an agricultural acceptable carrier.



28. (Withdrawn) A composition comprising an antagonist or agonist of the activity of a polypeptide encoded by the nucleic acid molecule of claim 6 conferring an increase in the amount of fine chemical in an organism or a part thereof.

29. (Withdrawn) Food or feed composition comprising the antagonist or agonist identified according to claim 17.

30. (Withdrawn) A method for identifying plant varieties having increased capacity for production of a fine chemical, wherein the method comprises using the nucleic acid molecules as claimed in claim 6 in mapping and/or breeding processes, and identifying plant varieties which have increased production of said fine chemical.

31. (Cancelled)

32. (Currently amended) The process of claim 2, wherein the nucleic acid molecule encodes a polypeptide having at least 95% sequence identity with the amino acid sequence of SEQ ID NO: 2 and conferring an increase in the amount of fine chemical in ~~an~~ the organism or a part thereof.